BYJU'S EXAM PREP

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Preparation App For All Exams

QUADRILATERAL

Part-III

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Agenda → 12th Jan' 2022

11am → Quadrilateral Part 3

~~Isosceles~~ Trapezium → (24-26) min
Kite

Practice Question → (12-15) Ques

1pm → Quadrilateral Part 4

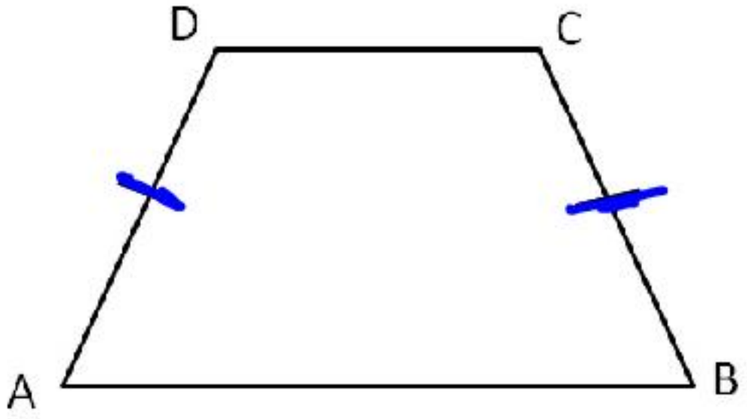
Practice Question → (12-15) Question

Total Question → 50

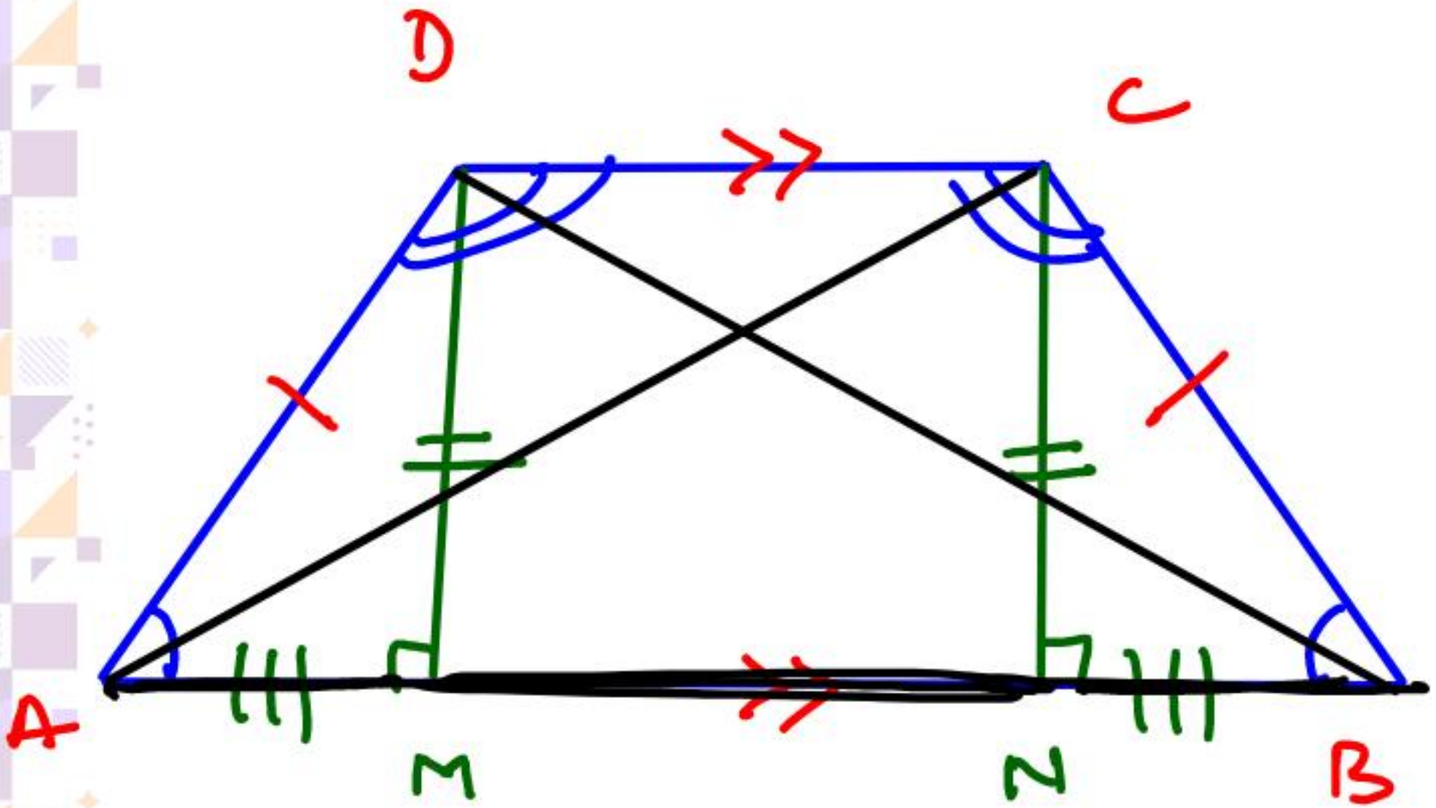
Class Discussion → 25

ISOSCELES TRAPEZIUM

Def: A trapezium in which non-parallel sides are equal.



AD = BC



Def :- $AD = BC$

$\triangle ADM \cong \triangle BCN$

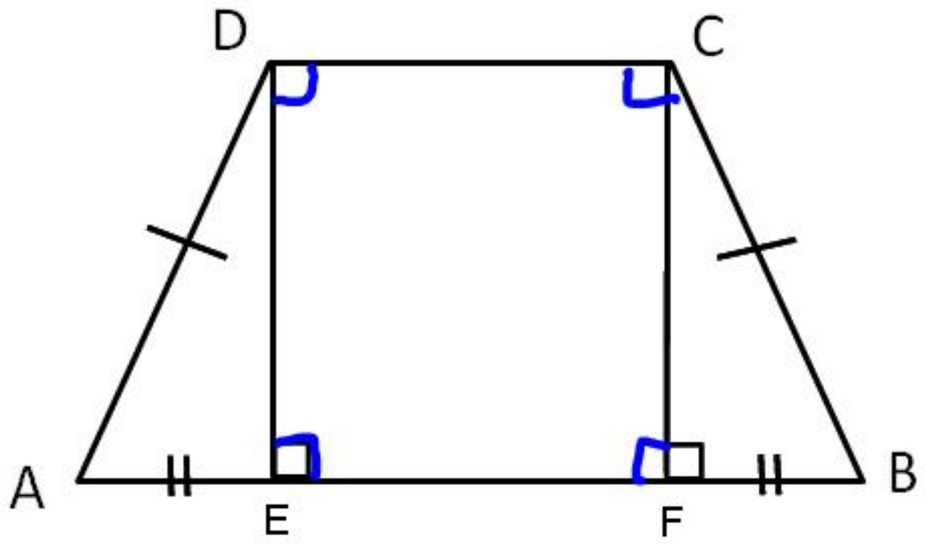
(By RHS)

$AM = BN$

$\angle A = \angle B$

$\angle D = \angle C$

$AC = BD$

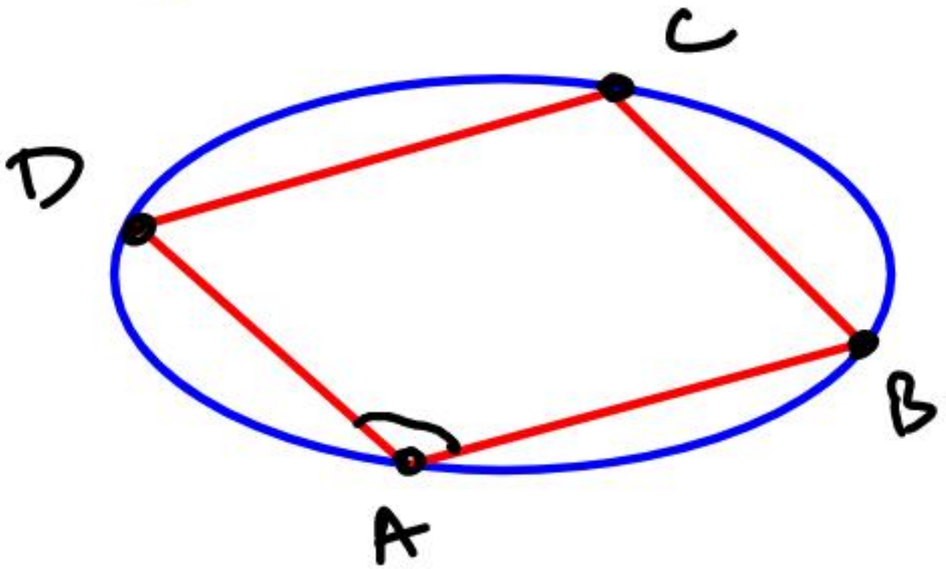


In Isosceles trapezium where AB || CD

(1) AD = BC
(2) AE = BF
(3) AC = BD
(4) $\angle D = \angle C$
(5) $\angle A = \angle B$

* Cyclic Quadrilateral

→ A quad in which all vertices of quad lie on a single circle



$\angle A + \angle C = 180^\circ$

$\angle B + \angle D = 180^\circ$

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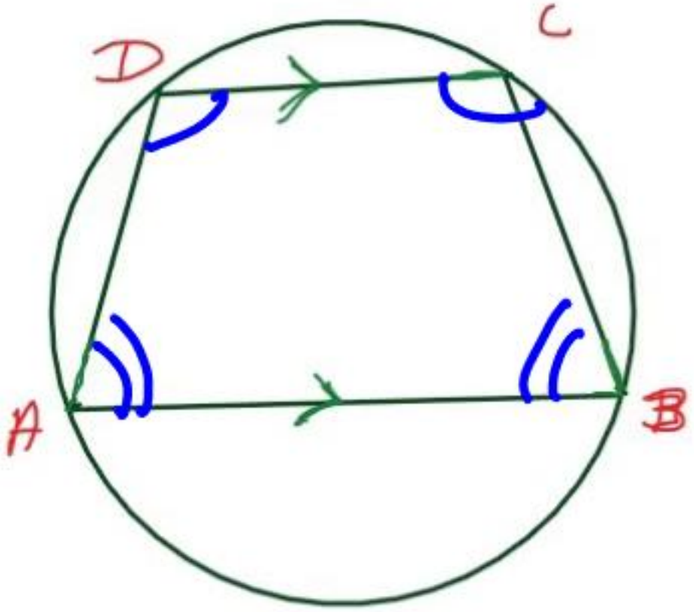
Cyclic trapezium is always an Isosceles Trapezium.



Given : ABCD is Trapezium

AB || CD

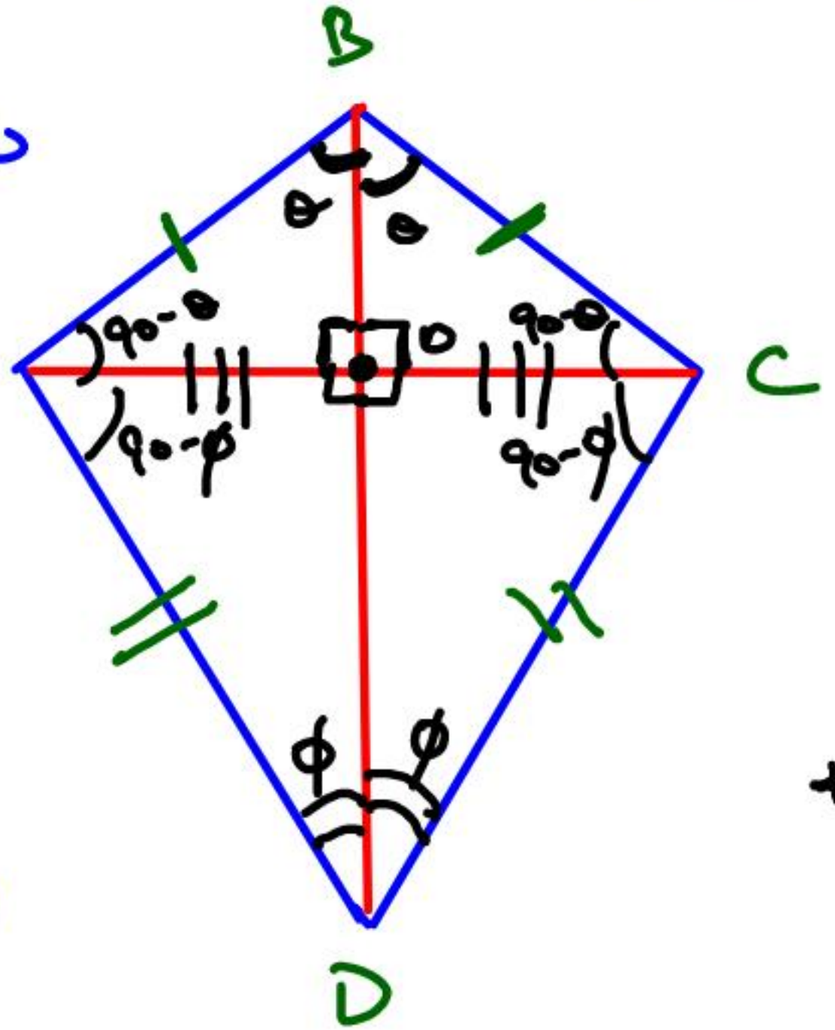
$\angle A + \angle D = 180^\circ$

$\angle A + \angle C = 180^\circ$

$\angle C = \angle D$

Isosceles Trapezium

KITE



$\frac{1}{2} AC \times BO$

$\frac{1}{2} AC \times DO$

$\frac{1}{2} AC\,(BD)$

$\frac{1}{2} AC(BD)$

Def $AB = BC$

& $AD = CD$

* $\angle AOB = \angle BOC = \angle COD = \angle DOA$

$= 90^\circ$

* $AO = OC$

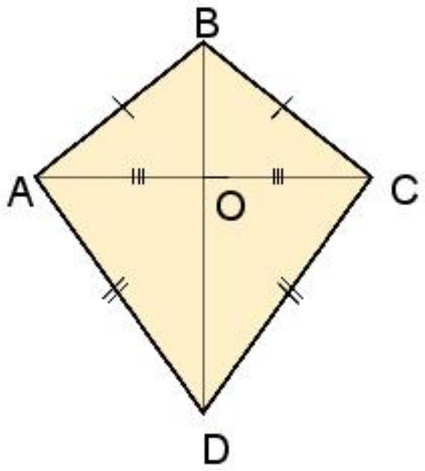
AC is not angle bisector

BD is angle bisector

$\angle A = \angle C$

KITE

Kite is a quadrilateral in which two pairs of adjacent sides are of equal length and the diagonals intersect each other at right angles.



(1) AB = BC

AD = CD

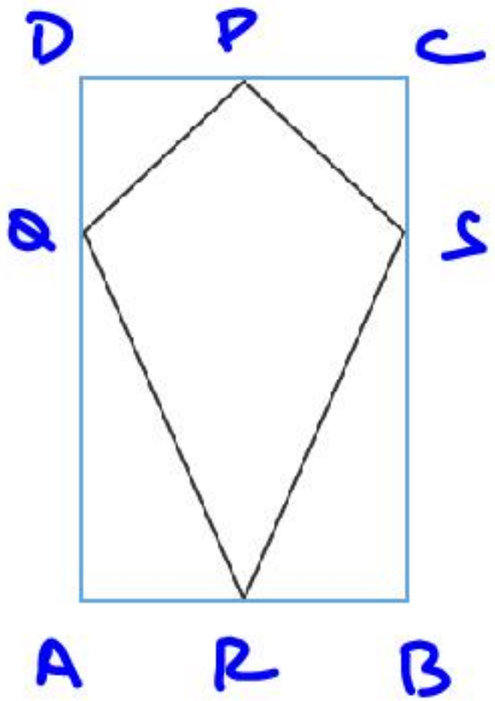
(2) $\angle AOB = \angle BOC = \angle COD = \angle DOA = 90°$

(3) AO = OC (The longer diagonal bisects the shorter diagonal.)

(4) $\angle A = \angle C$

$$\textit{Area of Kite} = \frac{1}{2} D_1 D_2$$

Eg15. The area of the rectangle is 80 cm^2, what is the area of the kite?



$AB \times BC = 80$

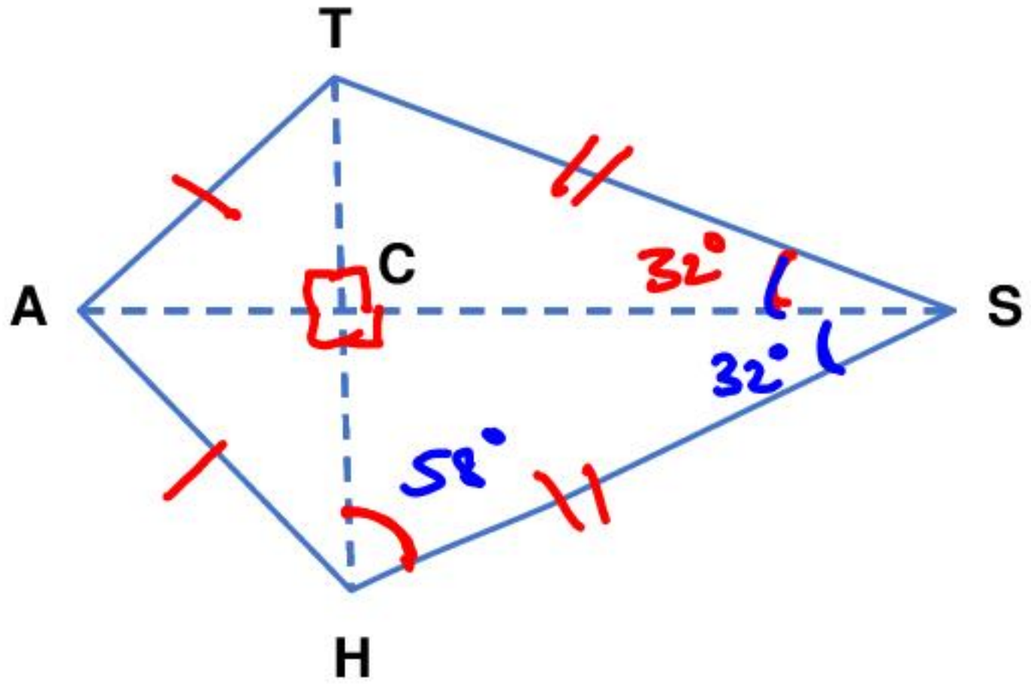
$\frac{1}{2} \times PR \times QS$

$\frac{1}{2}(BC)(AB)$

$\frac{1}{2} \cdot 80 = 40 cm^2$

Eg16. HATS is a kite with diagonals that intersect at C.
$\angle TSC = 32°$. Find $\angle SHC$.

$\angle SHC = 58°$



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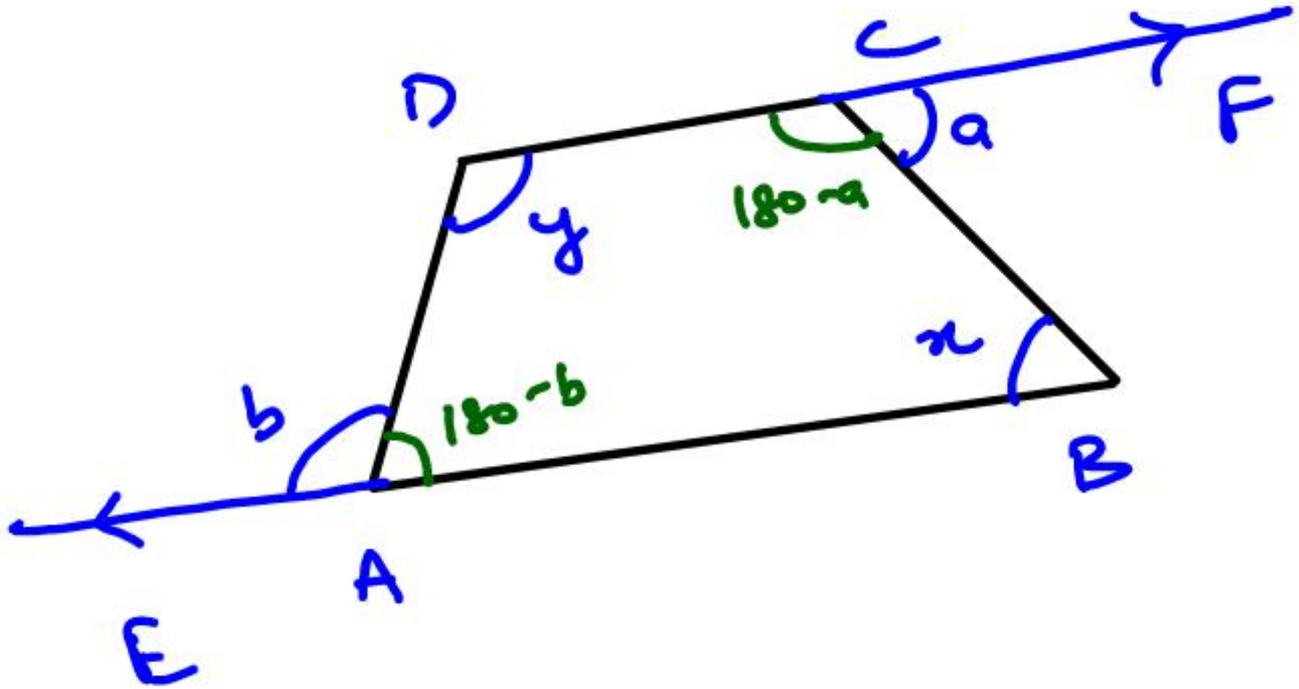
PRACTICE QUESTIONS

Q1. In quadrilateral ABCD, producing side BA and DC at E and F and $\angle ABC = x°$, $\angle ADC = y°$, $\angle BCF = a°$, $\angle DAE = b°$ then $x + y = ?$

(a) $a + b$ (b) $2a + b$

(c) $2b + a$ (d) $a + 3b$



$x + 180 - a + y + 180 - b$

$= 360$

$x + y = a + b$

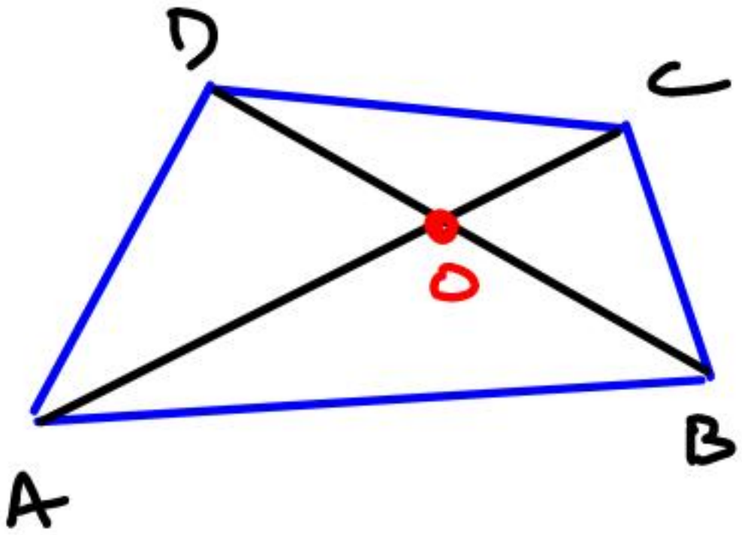
Ans. (a)

2min

Q2. ABCD is a quadrilateral in which AC and BD are diagonals and diagonals intersect at O, then : AB + BC + CD + DA

(a) > 2(AC + BD) (b) > AC + BD

(c) < 2(AC + BD) (d) Both b & c



ΔABC $AB + BC > AC$

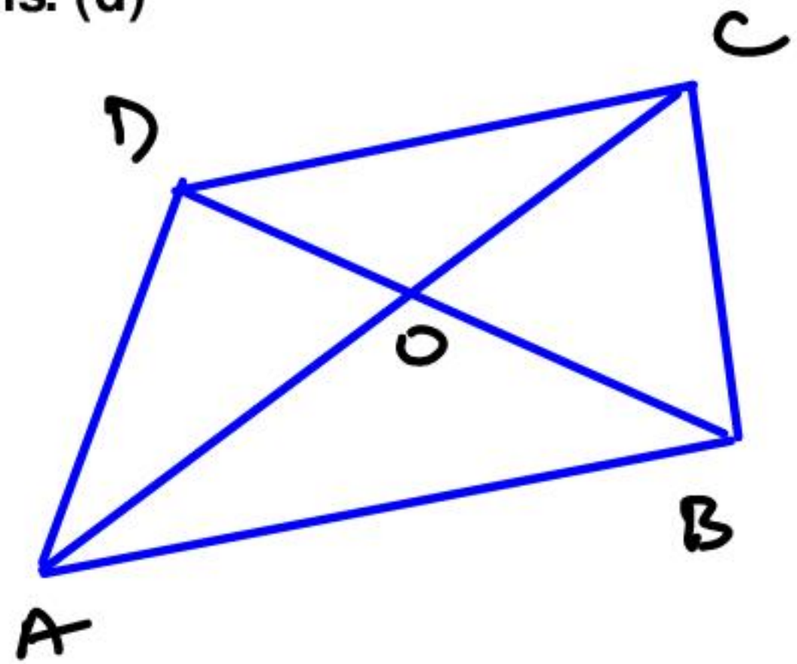
ΔBCD $BC + CD > BD$

ΔCDA $CD + DA > CA$

ΔDAB $DA + AB > DB$

$AB + BC + CD + DA > AC + BD$

Ans. (d)



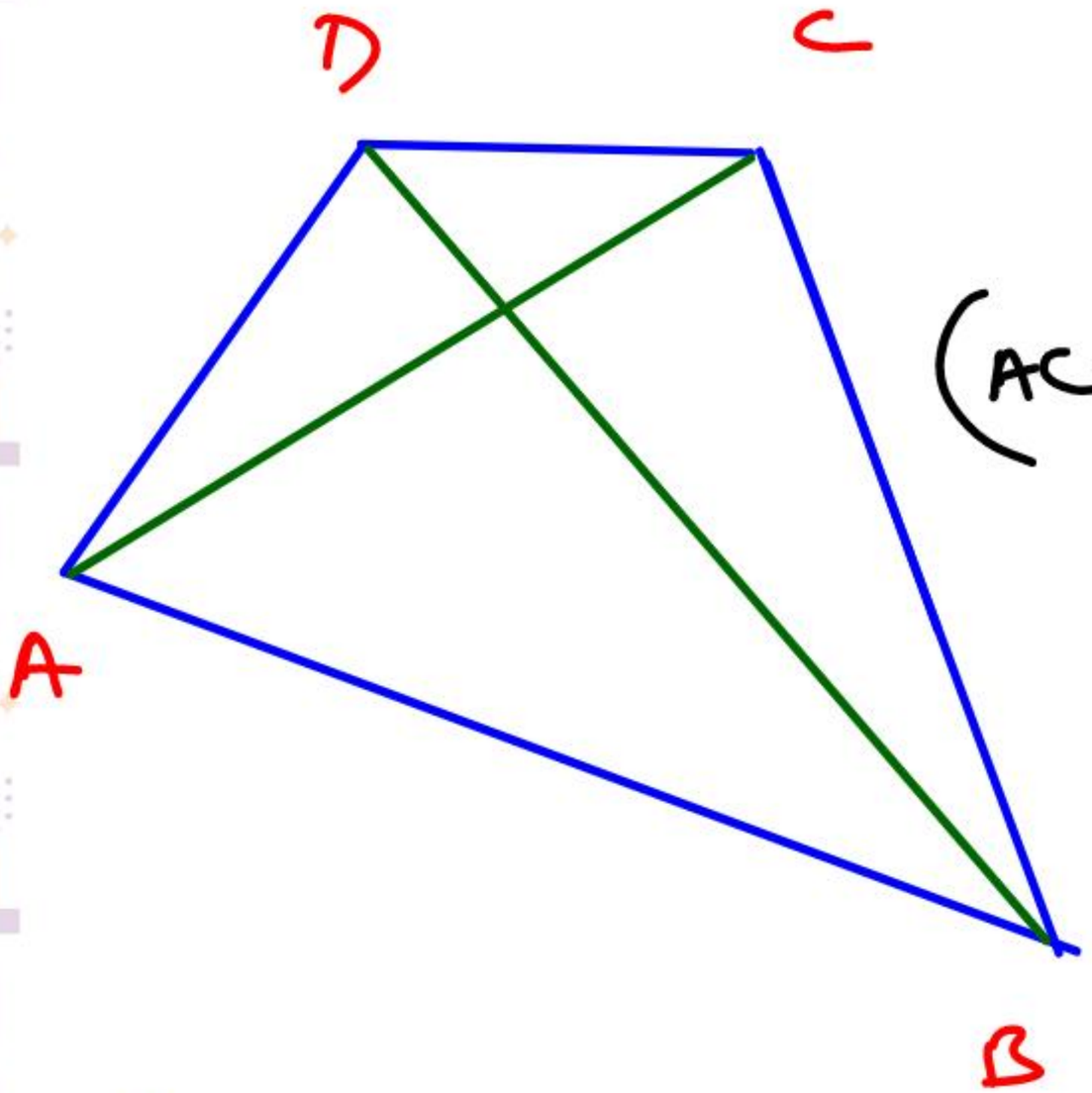
$\triangle AOB$ $\quad AO + BO > AB$

$\triangle BOC$ $\quad BO + CO > BC$

$\triangle COD$ $\quad CO + DO > CD$

$\triangle DOA$ $\quad DO + AO > AD$

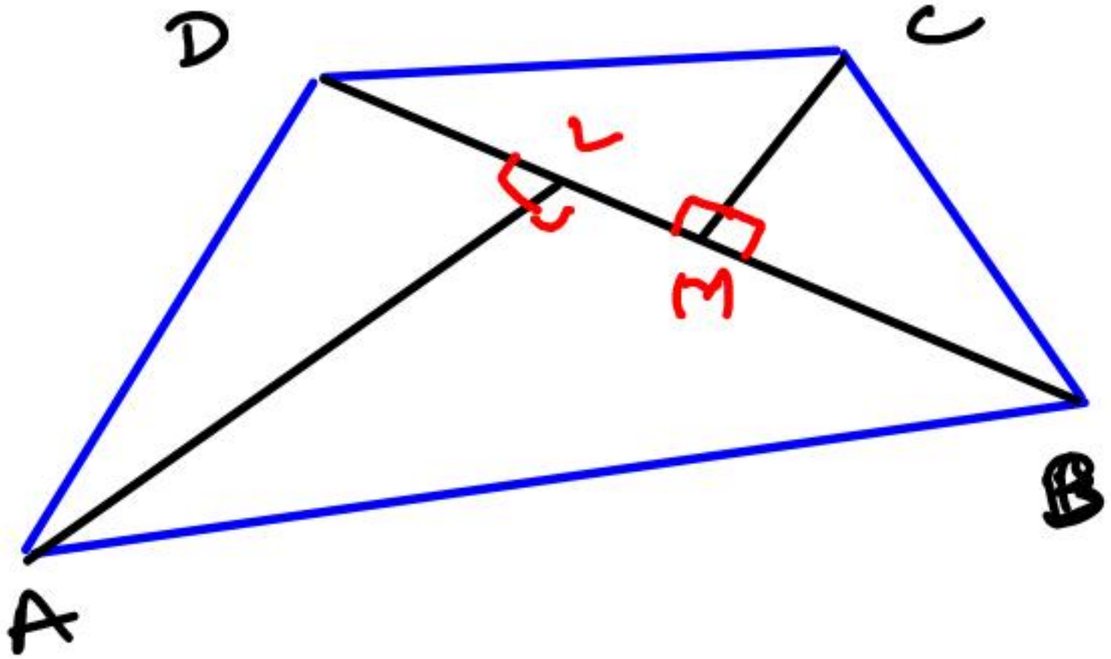
$2(AC + BD) > AB + BC + CD + DA$



$$(AC+BD) < AB+BC+CD+DA < 2(AC+BD)$$

Q3. ABCD is a quadrilateral in which diagonal BD = 64 cm, AL ⊥ BD and CM ⊥ BD, AL = 13.2 cm and CM = 16.8 cm, Find the area of ABCD (in cm^2)?

(a) 422.4
(b) 690
(c) 537.6
(d) 960



$\frac{1}{2} BD(AL+CM)$

$\frac{1}{2} \times 64 (13.2+16.8)$

$= 960\ cm^2$

Ans. (d)

Q4. The ratio of angles of a quadrilateral in order is 1 : 2 : 3 : 4 then the quadrilateral is :

(a) Parallelogram

(b) Rectangle

(c) Rhombus

(d) Trapezium

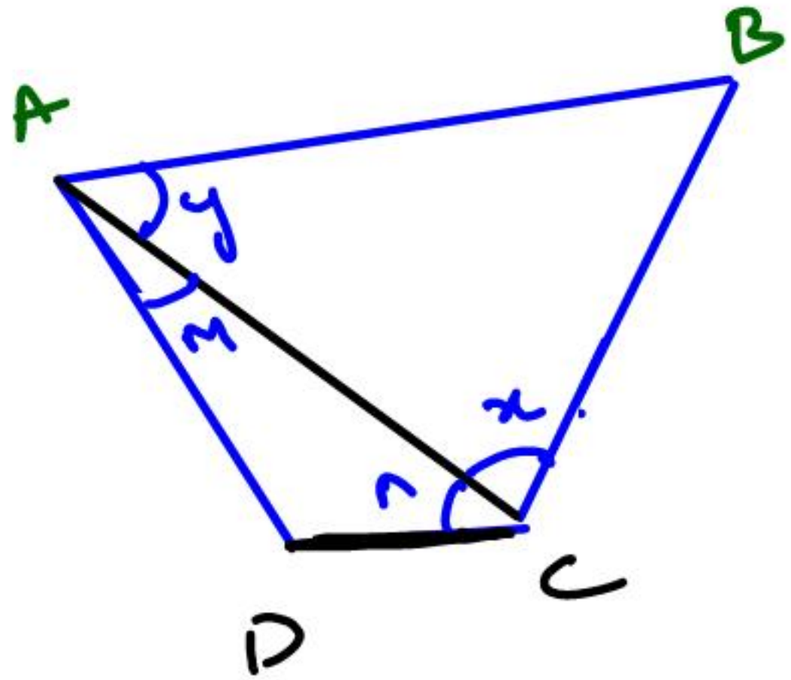
Ans. (d)

90sec

Q5. ABCD is quadrilateral in which AB is greatest side and CD is smallest side then-

(a) $\angle C > \angle A, \angle D > \angle B$ (b) $\angle C > \angle B, \angle A > \angle D$

(c) $\angle C > \angle D, \angle A > \angle B$ (d) $\angle C > \angle D, \angle B > \angle A$



ΔABC

$AB > BC$

$x > y$ — (1)

ΔADC

$AD > CD$

$n > m$ — (2)

$\angle C > \angle A$

Ans. (a)

Q6

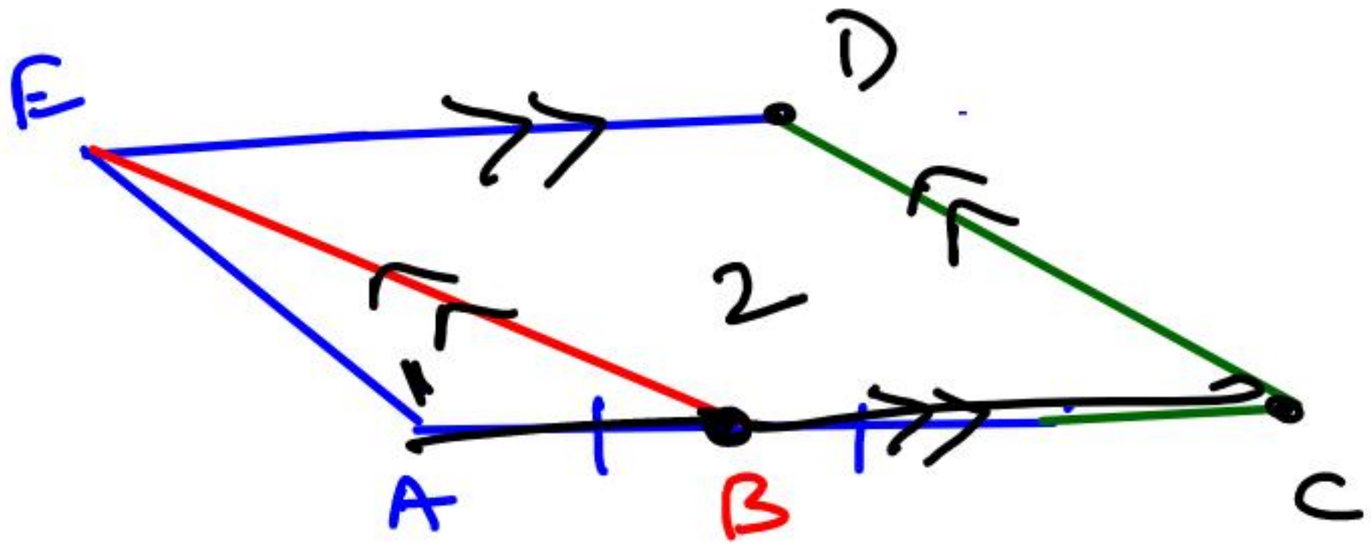
Area of a quadrilateral ACDE is 36 cm² If B is the mid point of AC. Find the area ΔABE of if AC || DE and BE || DC

(a) 10 cm²

(b) 9 cm²

(c) 12 cm²

(d) Can't be determined



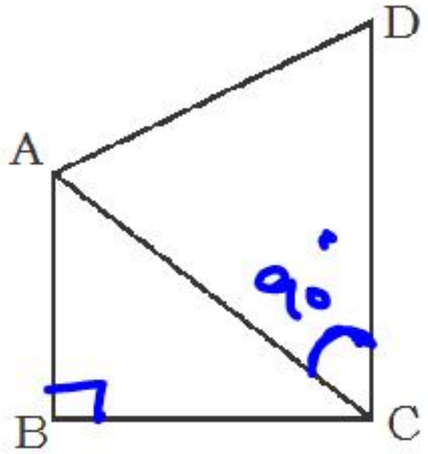
3 → 36cm²

1 → 12cm²

Ans. (c)

Q7. In the quadrilateral ABCD, $\angle B = 90°$ and $AD^2 = AB^2 + BC^2 + CD^2$, then find the measure of $\angle ACD$

(a) 45°
(b) 60°
(c) 90°
(d) 30°

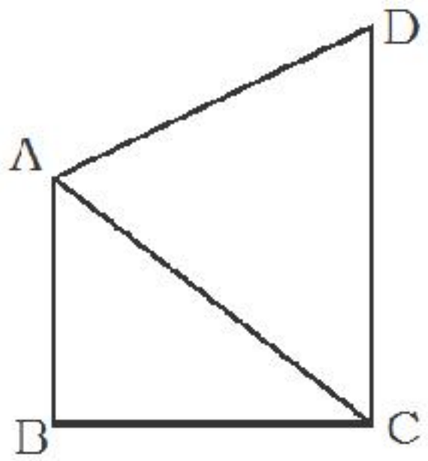


$AC^2 = AB^2 + BC^2$

$AD^2 = AB^2 + BC^2 + CD^2$

$AD^2 = AC^2 + CD^2$

Ans. (c)



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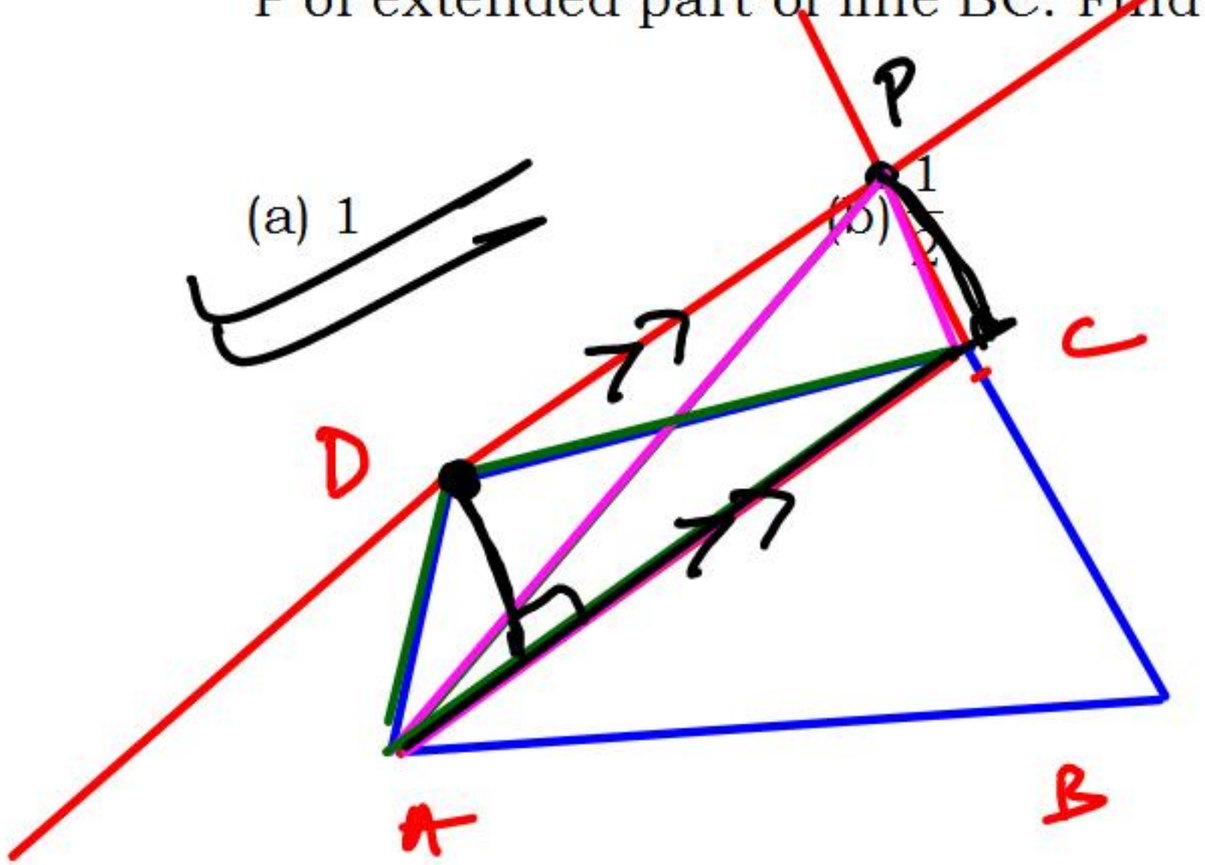
V.V Imp

2 min

Q8. ABCD is a quadrilateral. A line from D parallel to digonal AC is cut at P of extended part of line BC. Find $\frac{\text{Area of } \Delta ABP}{\text{Area of } \square ABCD}$



(a) 1 (b) $\frac{1}{2}$ (c) $\frac{2}{1}$ (d) $\frac{1}{4}$

ΔABP $ABCD$

$\Delta ABC + \Delta ACP$ $\Delta ABC + \Delta ACD$

Ans. (a)

Q9. In a parallelogram ABCD, one side AB = 24 cm and second side AD = 16 cm. Distance between AB and DC is 10 cm. Therefore, distance between AD and BC will be ?

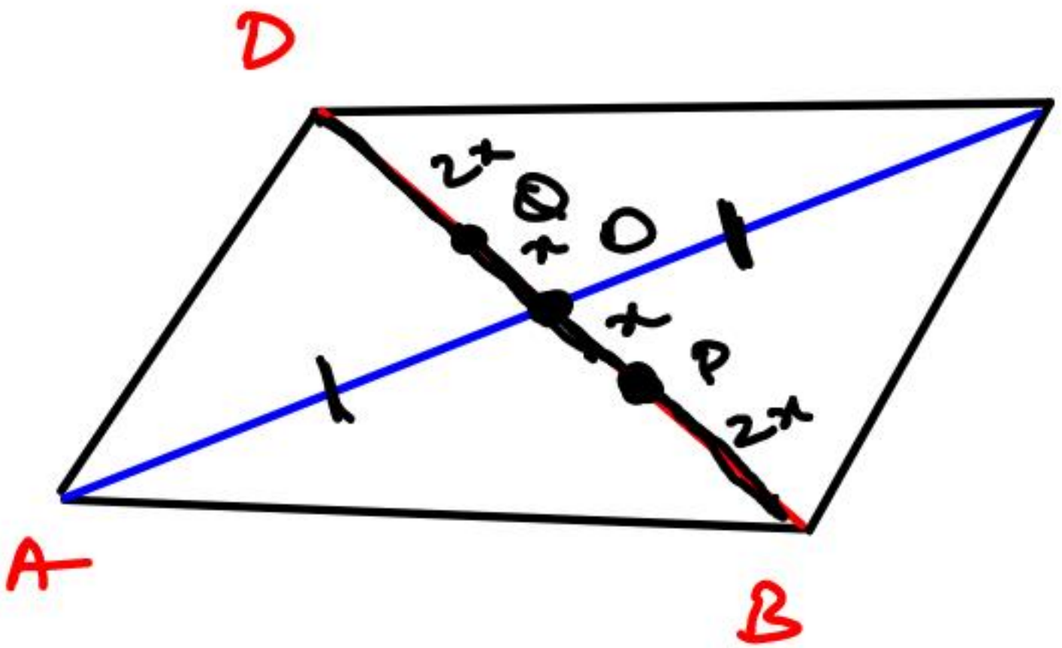
(a) 16 cm
(b) 18 cm
(c) 15 cm
(d) 26 cm

Ans. (c)

Q10. The length of the diagonal BD of the parallelogram ABCD is 18 cm. If P and Q are the centroid of the ΔABC and ΔADC respectively then the length of the line segment PQ is :

(a) 4 cm (b) 6 cm

(c) 6 cm (d) 12 cm



$6x = 18$

$PQ = 2x$

$2x = 6\ cm$

Ans. (b)

Q11. The adjacent sides of a parallelogram are 12 cm and 8 cm and its one diagonal is 10 cm then other diagonal is :

(a) 7.68 cm (b) 10 cm

(c) $2\sqrt{79}$ cm (d) 13 cm

Ans. (c)

Q12. Diagonals of a parallelogram are 10 cm and 24 cm respectively. If one of side is 13 cm, then the area of parallelogram is :

(a) 60 cm^2 (b) 120 cm^2

(c) 130 cm^2 (d) 240 cm^2

Ans. (b)

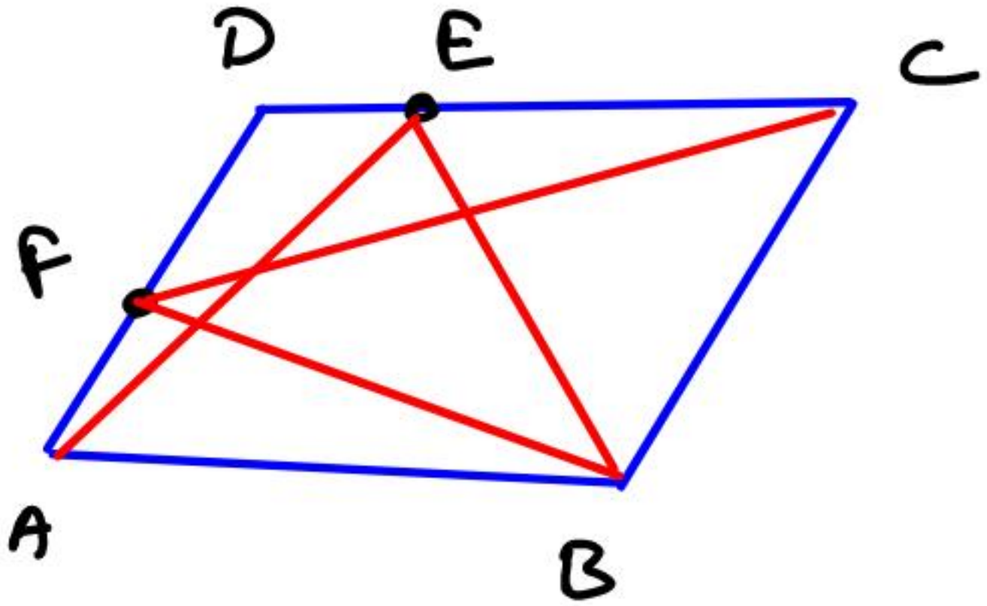
Q13. ABCD is a parallelogram AB is divided at P and CD at Q so that AP : PB = 3 : 2 and CQ : QD = 4 : 1 if PQ meets AC at R then AR =

(a) $\frac{2}{7}$ AC (b) $\frac{3}{7}$ AC (c) $\frac{4}{7}$ AC (d) $\frac{5}{7}$ AC

Ans. (b)

Q14. ABCD is a parallelogram. If E and F are two points situated on side DC and AD respectively. A_1 and A_2 are the area of ΔAEB and ΔBFC, then -

(a) $A_1 = A_2$ (b) $A_1 = 2A_2$ (c) $2A_1 = A_2$ (d) $2A_1 = 3A_2$



$\Delta AEB = \frac{1}{2}$ area (||gm ABCD)

$\Delta BFC = \frac{1}{2}$ area ||gm ABCD

Ans. (a)

Q15. ABCD is a parallelogram in which diagonals AC and BD intersect at O. If E, F G and H are the mid points of AO, DO, CO and BO respectively, then the ratio of the perimeter of the quadrilateral EFGH to the perimeter of parallelogram ABCD is :

(a) 1 : 4 (b) 2 : 3 (c) 1 : 2 (d) 1 : 3

Ans. (c)

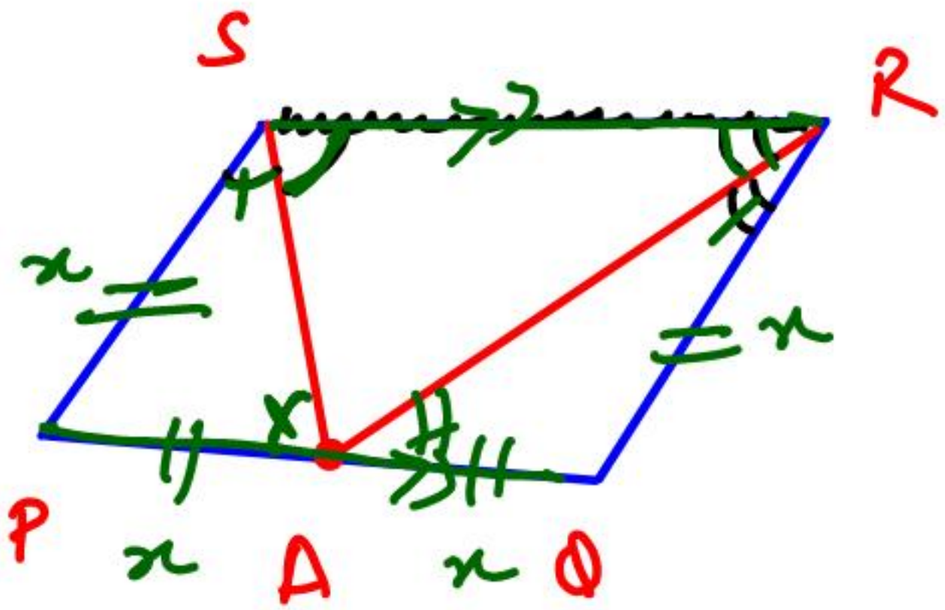
Q16. PQRS is a parallelogram. A is point on side PQ. Joining SA and RA such that it bisects ∠PSR and ∠QRS, then SR is equal to -

(A) 2PQ

(B) 2QR

(C) QR

(D) 4PQ



Ans. (b)

Q17. In parallelogram ABCD, the line BE (where E is a point on AD) intersect AC at F then

(A) $EF \times FB = AE \cdot FC$ (B) $BF \times FA = EF \cdot FC$

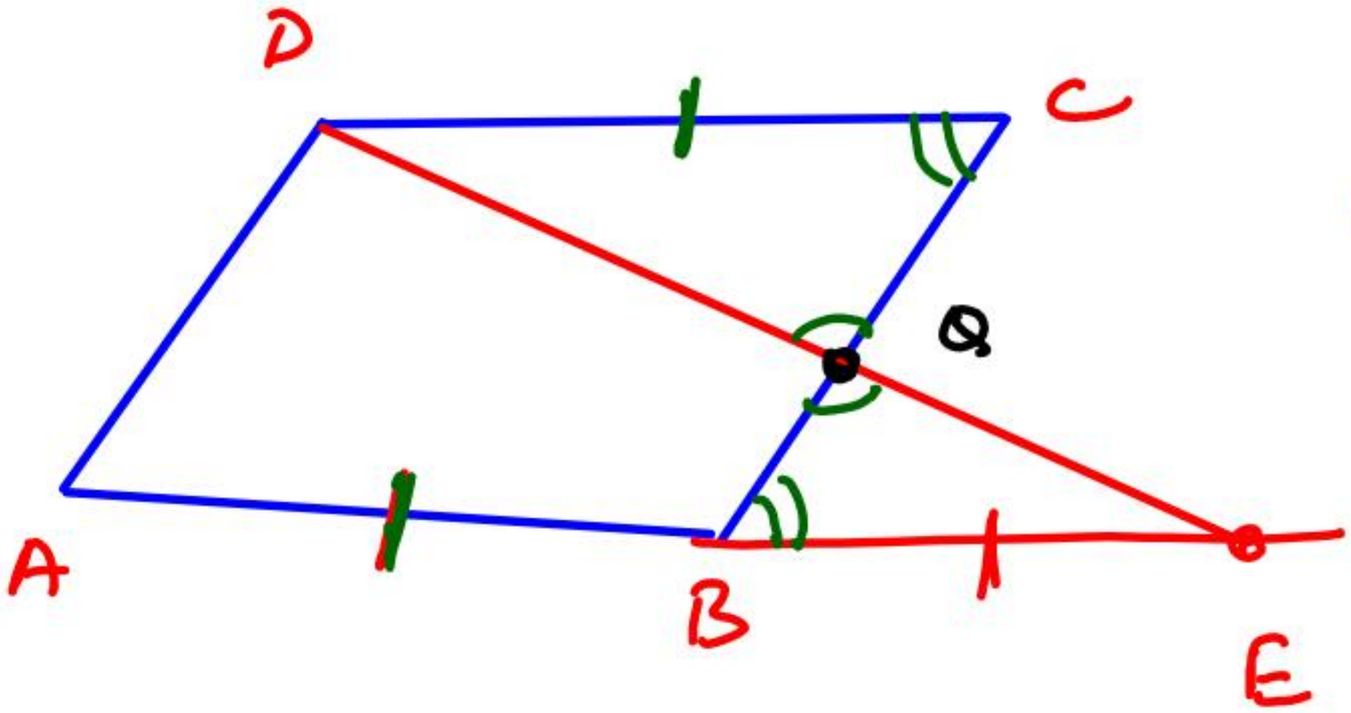
(C) $AE \cdot FC = BC \cdot AF$ (D) $AE \cdot AB = BC \cdot FB$

Ans. (b)

Q18. The side AB of a parallelogram ABCD is produced to E in such way that BE = AB. DE intersects BC at Q. The point Q divides BC in the ratio.

(a) 1 : 2 (b) 1 : 1

(c) 2 : 3 (d) 2 : 1



QB : QC

$\Delta DQC \sim \Delta EQB$

$\Delta DQC \cong \Delta EQB$ (AAS)

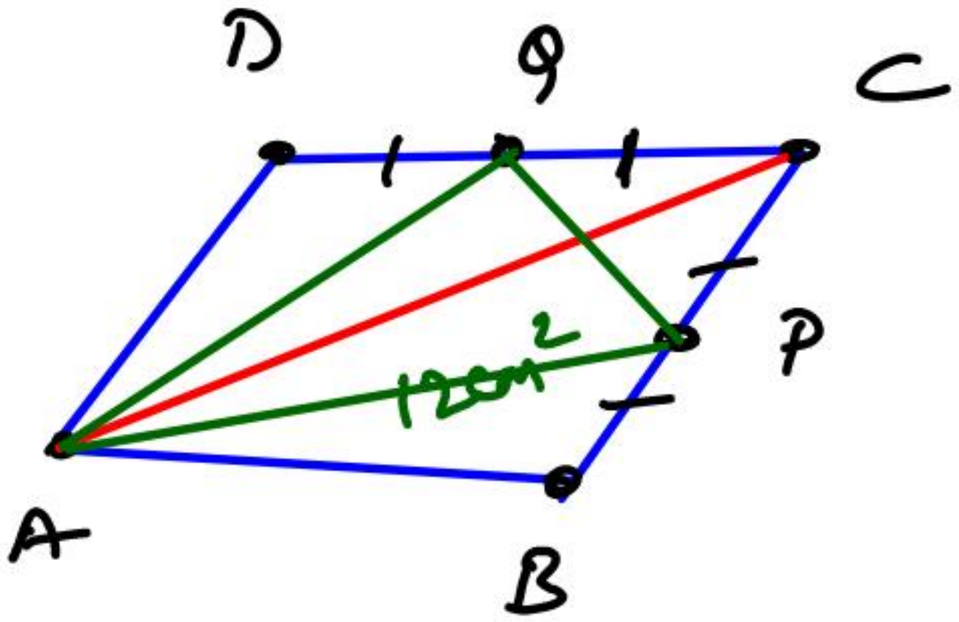
QC = QB

Ans. (b)

Q19. ABCD is parallelogram P and Q are the mid-points of sides BC and CD respectively. If the area of ΔABC is 12 cm^2, then the area of ΔAPQ is :

(a) 12 cm^2 (b) 8 cm^2

(c) 9 cm^2 (d) 10 cm^2



ABC → 12cm²

4 → 12cm²

ΔAPQ → 3

9cm²

Ans. (c)

Q20. One of the diagonal of a parallelogram is 17 cm and an angle of the parallelogram is 45°. If height of the parallelogram is 8 cm then area of the parallelogram is :

(a) 184 cm^2 (b) 88 cm^2

(c) 92 cm^2 (d) 104 cm^2

Ans. (a)

Q21. In a parallelogram ABCD, the mid-point of AB is H. The line parallel to DH and passing through B meets extended AD at K. If BC = 6 cm, then DK is-

(a) 10 cm (b) 4 cm

(c) 8 cm (d) 6 cm

Ans. (d)

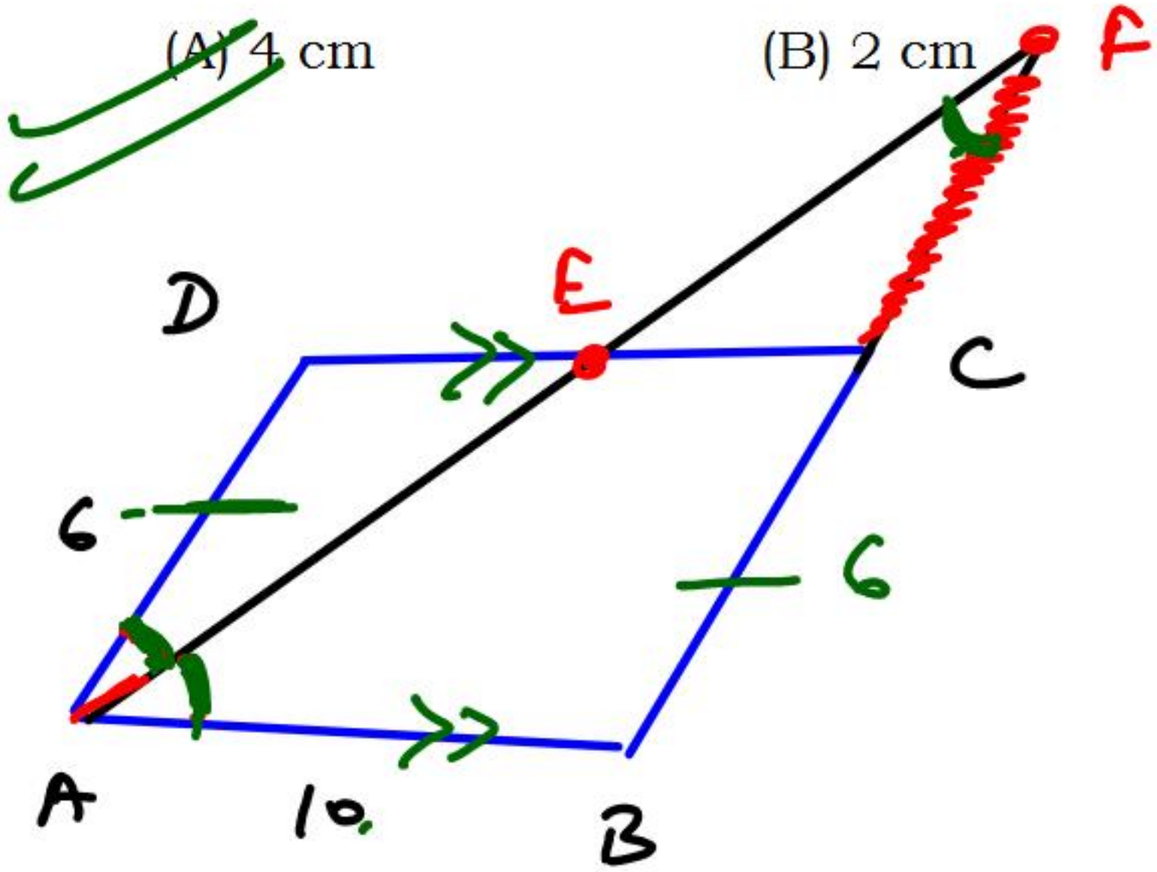
Q22. In a parallelogram ABCD, M is the mid point of BD. BM is the angle bisector of $\angle B$. What is the value of $\angle$AMB?

(a) 30° (b) 45° (c) 60° (d) 90°

Ans. (d)

Q23. ABCD is a parallelogram in which AB = 10 cm, AD = 6 cm. Bisector of ∠A meets DC at E and extended BC at F. Therefore, length of CF will be ?

(A) 4 cm (B) 2 cm (C) 6 cm (D) 8 cm



$\triangle AFB$

$BF = 10$

$BC + CF = 10$

$6 + CF = 10$

$CF = 4$

Ans. (a)

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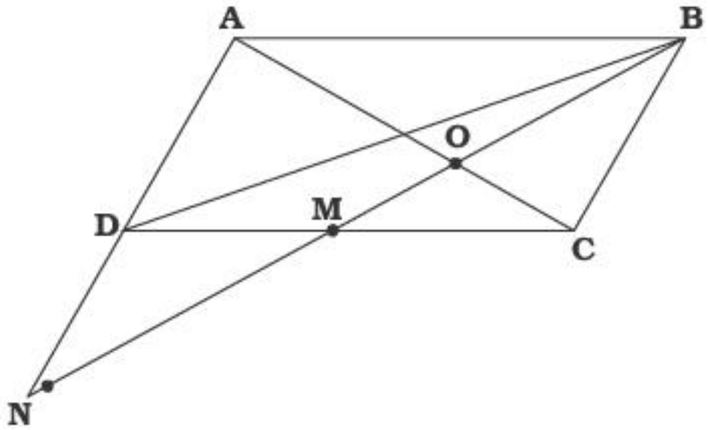
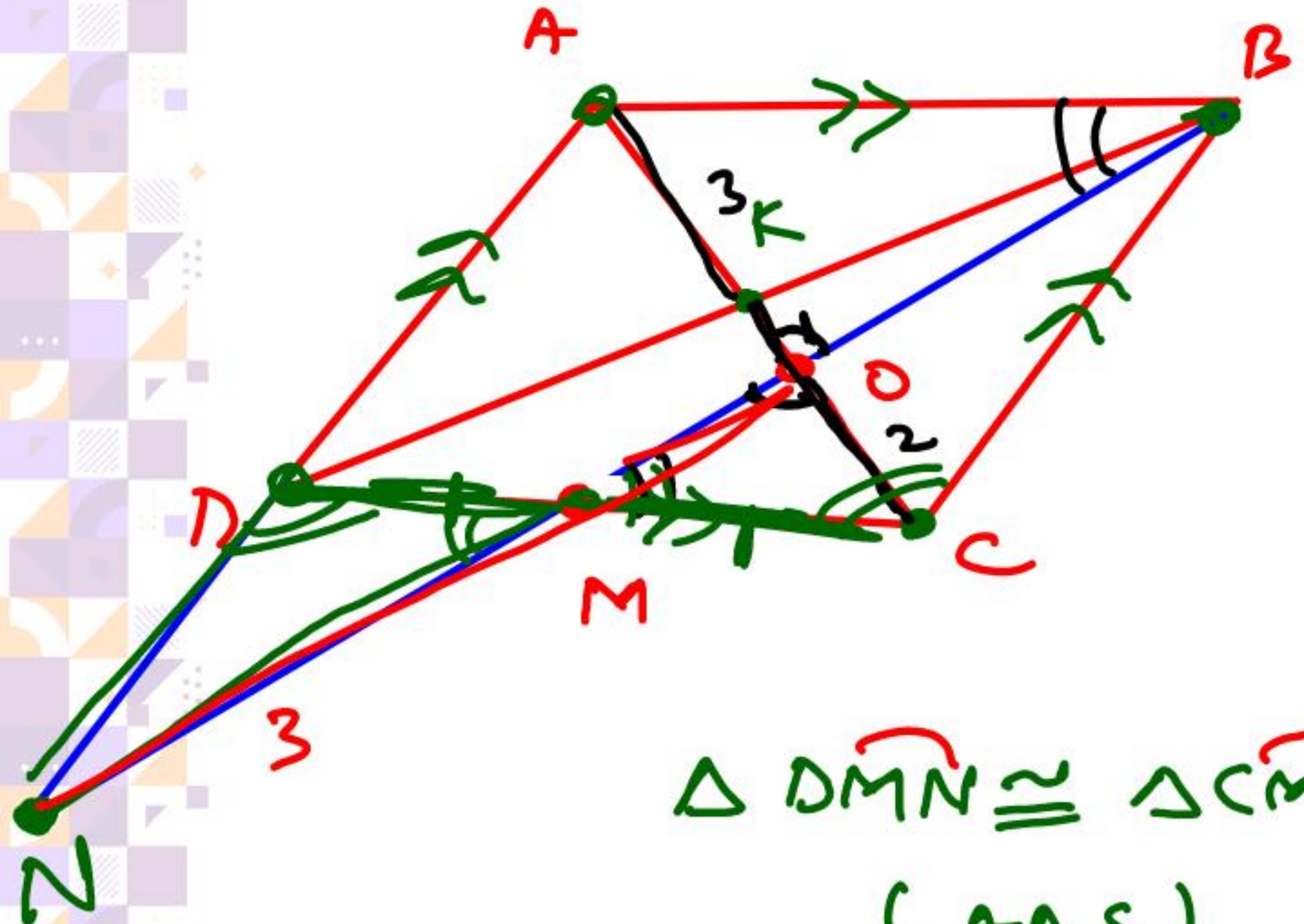
V. Imp

2 min

Q24. In the figure above, M is the mid-point of the side CD of the parallelogram ABCD. What is ON : OB ?

(a) 3 : 2
(b) 2 : 1
(c) 3 : 1
(d) 5 : 2





ΔBCB

BM & CK are median

O → centroid

$\Delta \overset{\frown}{AOB} \sim \Delta \overset{\frown}{COM}$

$\Delta \overset{\frown}{DMN} \cong \Delta \overset{\frown}{CMB}$

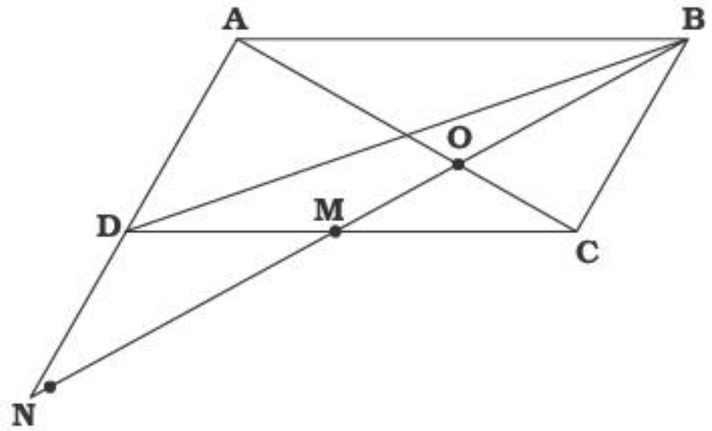
(AAS)

$\frac{BO}{MO} = \frac{2}{1}$

2 1

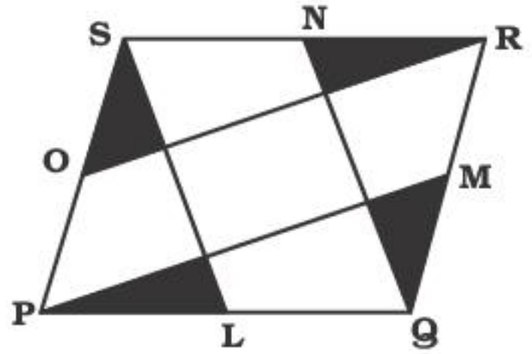
ON : OB = K : 2K

Ans. (b)



Q25. In the parallelogram PQRS, L, M, N and O are mid points of sides PQ, QR, RS and SP respectively. PM, QN, RO and SL are joined. Find the ratio of the area of the darked region to the area the parallelogram PQRS.

(a) 1/5
(b) 1/4
(c) 4/15
(d) 1/6



Ans. (a)